

fine carina present between base of prothorax and the transverse sulcus.

Elytra strongly convex, much broader than long; base strongly quadrifoveate, with a sharp carina, which on either side extends on to the elytra in a well-marked humeral callus which ends abruptly and does not extend further as a carina; discal stria lacking, sutural stria entire; surface clothed with golden recurved hairs more sparsely placed than on the prothorax.

Abdomen equal in length to the elytra, regularly rounded to the apex; first dorsal segment longer, the rest subequal; a broad and deep fovea present on either side at the lateral margins of the base of the first dorsal segment.

Length 1.6 mm. *Breadth* .9 mm.

Described from one female specimen collected in April, 1924, by Dr. J. C. Bradley, on Barro Colorado Island, Canal Zone, Panama. *Holotype* in the collection of Cornell University, No. 767.

Panamensis is a member of Raffray's group II, containing three heretofore described species, namely, *rugipes* Raffray from Venezuela, *globipennis* Reitter from Mexico, and *humeralis* Raffray from Colombia.

From *rugipes*, *panamensis* is easily known by its much smaller size, by the very small and peculiarly formed foveae of the head, and by the transverse thoracic sulcus not being dilated or foveate at the middle.

From *globipennis* it differs in its much smaller size, non-carinate prothorax, the transverse ninth and tenth antennal segments, etc.

From *humeralis* to which it is most closely related, it may be distinguished by its smaller size, very feeble foveae of the vertex, the peculiar foveae of the head, and the absolutely smooth elytra.

Beneficial Insects Trapped in Bait-pails.

By S. W. FROST, Arendtsville, Pennsylvania.*

In operating bait-pails as traps for the adults of the oriental fruit moth (*Laspeyresia molesta* Busck.), many insects were captured including beneficial, injurious and forms otherwise

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classified. Some of the Lepidoptera and Coleoptera were, at times, so numerous that they interfered with the operation of the baits. A future paper will be devoted to rare and interesting insects recovered from bait-pails, but at present, beneficial insects are most important and have an economic bearing upon the problem of bait-pails as a means of control not only for the oriental fruit-moth but also for any pest where such baits may seem practical.

This paper is not confined to the predaceous and parasitic enemies of the oriental fruit-moth but to all beneficial insects that might be reduced in numbers through the use of liquid-baits. Comparatively few have been found in appreciable numbers and only species of Chrysopidae have been trapped in sufficient abundance to be concerned in the practical use of such baits. The insects show a decided preference for certain types of baits. Honey-bees, for example, prefer water or sugar solution, Syrphidae seem to like baits of low grade molasses, while Chrysopidae were taken abundantly in all baits but show a preference for sweet baits rather than water.

The insects in question were caught during the summer of 1926 from four hundred and thirty bait-pails placed in a peach orchard near Arendtsville, Pa. The baits consisted of various mixtures, chiefly sugar and molasses solutions, although several weak acids and other mixtures were used. They were duplicated at different times during the season so that a particular type of bait was in operation throughout the entire summer from May to November. Variations exist due to the age of the bait, dilution, etc. All baits were examined once a week and the insects strained from them and taken to the laboratory for further examination and classification.

Adalia bipunctata (L.) and other beneficial Coccinellidae were taken occasionally from baits but in numbers noticeably insignificant.

Syrphidae were trapped in comparatively small numbers. During the early part of the summer, *Ferdinandea dives* O. S. was fairly common while later in the season several other species were taken. In July a single specimen of *Tolucella vesiculosa* Fab. was captured. Mr. Charles T. Greene has further identified specimens of *Syrphus ribesii* Linn., *Mesogramma*

polita Say and *M. marginata* Say, which were taken from bait-pails. None of the Syrphidae, however, were taken in abundance.

Honey-bees were found in bait-pails throughout the entire season, especially during the warmer parts of the summer in August and September. Their numbers were comparatively small. Many were trapped by sugar baits or by weak acids but only a very few by molasses baits. A set of five pails, containing a high-grade molasses bait, was placed in a small block of quince trees within a radius of ten feet from bee-hives. Only three bees were caught between May 5th and August 18th, although the baits were kept in prime by the addition of new molasses about every two weeks. It would seem, therefore, that molasses baits are entirely safe in the proximity of bee-hives.

A species of Hemerobiidae was found in bait-pails in small numbers during the latter part of the summer. As little is known concerning the feeding of the adults of this family, these records may prove interesting.

Several species of Chrysopidae were attracted to baits in large numbers, some pails caught as many as fifty during their operation. Three species: *Chrysopa nigricornis* Burm., *C. rufilabris* Burm., and *C. quadripunctata* Burm., were determined by Dr. Roger C. Smith. A fourth species may be included, *C. interrupta* but the loss of color due to the action of the bait and the preservative made it impossible to make an absolute determination. The majority of the adults were females. Smith (1922)* refers to a difference of opinion concerning the feeding of the adults and remarks that he found them to relish water and sugar solution. The enormous numbers captured by sugar and molasses baits, and on the other hand, the comparatively few captured by plain water, clearly shows that *Chrysopa* is readily attracted to sugar and molasses solutions.

An attempt was made to determine whether parasitic insects, especially the parasites of the oriental fruit-moth, were attracted by these baits, but the percentage of parasitism was low during 1925 and 1926 and few parasites were recovered

*Cornell Memoir 58:1328, 1922.

from baits. This phase of the problem needs further investigation.

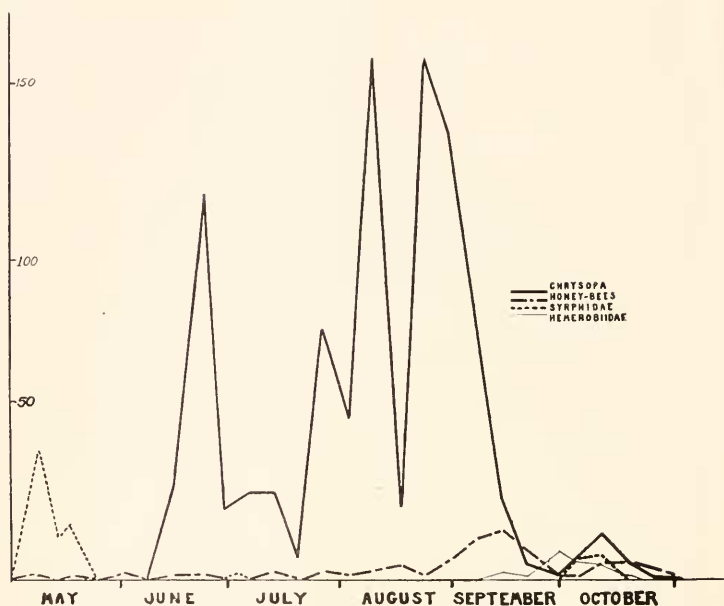


Chart showing the comparative numbers of beneficial insects trapped by baits.

Summary of Beneficial Insects Taken in Bait-pails in 1926.

INSECT	Low grade molasses 85 pails	High grade molasses 90 pails	Sugar baits 50 pails	Sodium ¹ baits 100 pails	Acid ² baits 60 pails	Misc. ² baits 40 pails	Water 5 pails	Total Number Insects
Honey Bees	7	17	20	18	4	6	2	74
Syrphidae	64	1	0	11	0	0	0	79
Hemerobiidae	0	2	13	3	0	0	1	19
Chrysopidae	133	309	194	241	6	54	4	941

From these notes it is evident that bait-pails can be used with comparative safety without attracting beneficial insects in alarming numbers. While Chrysopidae were trapped in considerable numbers, it is not definitely known that the adults are predaceous. A further knowledge of the percentage of males and females trapped, as well as the number of gravid females caught, would be necessary to settle the point. Sugar baits should be avoided in the proximity of bee-hives.

¹ Consisting of 1 part molasses, 10 parts water with the addition of sodium salt as a preservative.

² These baits were continued for only a few weeks.